

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method of performing route lookups for a plurality of data received via a network, comprising:

processing, by a processor, [[a]] first data to generate first routing information for the first data, until it is anticipated that first information is needed to continue the processing of the first data, wherein a first partial processing result or a first process state is obtained for the first data;

requesting, by the processor, the first information from an agent associated with the processor;

causing, by the processor, a storing of first context state information comprising a corresponding to the first partial processing result or [[a]] the first process state for the first data;

processing, by the processor, [[a]] second data before receiving the requested first information is received from the agent to generate second routing information for the second data, until it is anticipated that second information is needed to continue the processing of the second data, wherein a second partial processing result or a second process state is obtained for the second data;

requesting, by the processor, the second information from the agent or another agent associated with the processor;

causing, by the processor, a storing of second context state information comprising a corresponding to the second partial processing result or [[a]] the second process state for the second data; [[and]]

receiving, by the processor, the requested first information from the agent; and
resuming processing, by the processor, ~~[[on]]~~ of the first data before receiving after the
requesting of the second information using the stored first context state information ~~after~~ and the
received requested first information ~~is received~~.

2. (currently amended) The method of claim 1, ~~further comprising:~~
~~receiving the requested first information from~~ wherein the agent or the other agent
comprises a memory.

3. (canceled)

4. (currently amended) The method of claim 2, further comprising:
processing, by the processor, ~~[[a]]~~ third data to generate routing information for the third
data, until it is anticipated that third information is needed to continue the processing of the third
data, wherein a third partial processing result or a third process state is obtained for the third
data, and

processing, by the processor, ~~[[a]]~~ fourth data to generate routing information for the
fourth data, until it is anticipated that fourth information is needed to continue the processing of
the fourth data, wherein a fourth partial processing result or a fourth process state is obtained for
the fourth data,

wherein at least one of said processing of ~~[[a]]~~ the third data ~~[[and]]~~ or said processing
~~[[a]]~~ the fourth data is performed before said receiving the requested first information.

5. (canceled)

6. (currently amended) A method of processing packet information for routing packets received via a network, comprising:

~~providing state information to allow a processor to store intermediate information;~~

processing, by a processor, ~~[[a]]~~ first data related to routing of a first received packet ~~until first information is needed;~~

determining that additional information associated with the first data will be needed to complete the processing;

discontinuing, based on the determination, the processing of the first data to form intermediate processing information;

requesting, by the processor, the ~~[[first]]~~ additional information from an agent associated with the processor;

storing, by the processor, the intermediate processing information related to the processing of the first data; and

processing, by the processor, ~~[[a]]~~ second data related to routing of a second received packet while waiting for the requested ~~first~~ additional information to arrive from the agent.

7. (currently amended) The method of claim 6, further comprising:

receiving, by the processor, the requested additional information from the agent; and

resuming the processing of the first data based on the stored intermediate processing information and the ~~first~~ received additional information.

8. (canceled)

9. (currently amended) A method for routing packets ~~of information~~ received at a network device using corresponding data structures into which the received packets are converted, the method comprising:

~~receiving a plurality of data structures related to the packets of information;~~

~~sending forwarding, using forwarding logic of the network device, the plurality data structures to a plurality of processing engines of the network device;~~

~~monitoring, by a monitor of the network device, respective processing states of the plurality of processing engines to allow the plurality of processing engines to generate identify partial processing results based on halted processing of the plurality of data structures by the processing engines in advance of a need for additional processing information for continued processing of the data structures;~~

~~performing, at each processing engine, concurrent route lookups for at least two of the data structures at a time using the partial processing results for the data structures;~~

~~modifying, at the processing engines, the data structures based on the route lookups; and~~

~~routing, using a switch fabric of the network device, the packets of information based on the modified data structures.~~

10. (currently amended) The method of claim 9, further comprising:

~~forwarding the modified data structures requesting, by the processing engines, the additional processing information from one or more agents associated with the processing engines, wherein a prospect of the requesting causes the halted processing.~~

11. (currently amended) The method of claim 9, further comprising:
conducting accounting, filtering, or policing functions on the data structures during said performing ~~[[step]]~~.

12. (currently amended) The method of claim 9, wherein said performing includes:
performing, at each processing engine, concurrent route lookups for up to four different data structures.

13. (currently amended) A network device comprising:
an input portion configured to receive data structures formed from data streams received via a network and to transmit data items associated with the data structures;
a plurality of processing engines, each processing engine configured to:
receive a plurality of data items from the input portion, and
contemporaneously compute routes for the ~~plurality of~~ data items by performing a set of computations, and wherein each processing engine comprises:
a data processor configured to at least partially calculate a route for a first data item based on a partial result of less than the entire set of computations due to an impending need for computation information which is identified for performing one or more of the computations of the set, and
a functional control state machine configured to control operation of the data processor by maintaining a ~~processing~~ route computation state ~~[[so]]~~ that the data processor can access to calculate the route for the first data item based on information

from the partially calculated route;

a resource configured to receive requests from the plurality of processing engines for the computation information;

a result processor configured to modify the data structures ~~based on~~ to include information on the routes computed by the plurality of processing engines; and

a memory configured to store ~~processing~~ route computation states or the partially calculated route for at least one of the plurality of processing engines.

14. (original) The network device of claim 13, wherein each of the plurality of processing engines includes multiple context-switched engines.

15. (original) The network device of claim 13, wherein the memory includes random access memory.

16. (currently amended) The network device of claim 13, wherein each of the plurality of processing engines includes:

a context buffer configured to store information about a partially calculated route using the partial result from the data processor and ~~a processing~~ the route computation state from the functional control state machine.

17. (currently amended) The network device of claim 13, wherein each of the plurality of processing engines further includes:

a context switch controller configured to cause the data processor and the functional

control state machine to respectively store the partially calculated route and the processing route computation state in the context buffer when the data processor requests [[data]] the computation information from the memory resource.

18. (original) The network device of claim 13, wherein each of the plurality of processing engines further includes:

an output buffer configured to store a fully calculated route for output to the result processor.

19. (currently amended) A system for performing concurrent route lookups for processing a plurality of data items, comprising:

a data processing portion configured to process one data item at a time and to pipeline data requests to a memory that stores information needed for the processing to thereby substantially eliminate idle time of the data processing portion associated with discontinuous processing of the one data item due to a request for the stored information;

a control state portion to monitor operation of the data processing portion by receiving state information related to a partial result produced from the discontinuous processing of the one data item by the data processing portion based on a prospective request for the stored information;

a buffer configured to store the partial result; and

a controller configured to load the partial result from the data processing portion into the buffer and to input another data item into the data processing portion for processing while requested data is obtained for ~~a prior~~ the one data item.

20. (original) The system of claim 19, further comprising:

an output buffer configured to store a completely processed data item from the data processing portion.

21. (original) The system of claim 19, further comprising:

an input buffer configured to store a plurality of data items to be processed by the data processing portion.

22. (currently amended) The system of claim 19, wherein the data processing portion includes:

a data processor configured to determine a route associated with ~~[[a]]~~ the one data item;
and wherein the control state portion includes:

a state machine configured to interact with the data ~~processor~~ processing portion and to inform the controller when the data ~~processor~~ processing portion will ~~be request~~ requesting data from the memory.

23. (currently amended) A system, comprising:

means for processing data structures to generate routing information and for requesting information from a source external to the means for processing when the information is projected to be needed to accomplish the processing of the data structures, wherein the requesting suspends a processing of one of the data structures to form partial results produced by the suspended processing;

means for monitoring operation of the means for processing via state information associated with the partial results produced by the means for processing ~~when generating the routing information;~~

means for storing the partial results from the means for processing ~~while waiting for~~ at least until such time as the requested information becomes available to the means for processing;
and

means for loading the partial results into the means for storing and loading ~~[[a]]~~ another data structure into the means for processing ~~when the means for processing requests the information~~ upon the suspension of the processing of the one data structure, and for loading the partial results into the means for processing after the requested information ~~arrives~~ becomes available and the processing of the other data structure is halted.